★ 請求項及び明細書において、Ｍ３として列挙されている元素中にＣｒが重複しておりました。今回の英文原稿はＰＣＴ出願の翻訳文ですので、日本語原文に従ってそのまま訳しておりますが、万一、他の元素を意図しておられた場合には当方にお知らせ下さい。

CLAIMS

[1] An information recording medium comprising at least a recording layer that records and/or reproduces information through irradiation with a laser beam or application of an electric current, and a dielectric layer,

wherein the dielectric layer comprises M1 (provided that M1 is at least one element selected from Sc, Y, La, Gd, Dy and Yb) and O.

[2] An information recording medium comprising at least two information layers, wherein at least one information layer comprises at least a recording layer that records and/or reproduces information through irradiation with a laser beam or application of an electric current, and a dielectric layer,

wherein the dielectric layer comprises M1 (provided that M1 is at least one element selected from Sc, Y, La, Gd, Dy and Yb) and O.

[3] The information recording medium according to Claim 1 or 2, wherein the dielectric layer further comprises M2 (provided that M2 is at least one element selected from Zr, Hf and Si).

[4] The information recording medium according to any one of Claims 1 through 3, wherein the dielectric layer further comprises M3 (provided that M3 is at least one element selected from Al, Ga, Mg, Zn, Ta, Ti, Ce, In, Sn, Te, Nb, Cr, Bi, Al, Cr, Ge, N and C).

[5] The information recording medium according to Claim 3, wherein the dielectric layer is represented by the composition formula
$M1_aM2_bO_{100-a-b}$ (provided that $10 < a < 40$ and $0 < b < 25$ (atom %)).

[6] The information recording medium according to Claim 4, wherein the dielectric layer is represented by the composition formula
$M1_cM3_dO_{100-c-d}$ (provided that $5 < c < 45$, $0 < d < 85$ and $25 < c+d < 95$ (atom %)).

[7] The information recording medium according to Claim 4, wherein the dielectric layer is represented by the composition formula
$M1_eM2_fM3_gO_{100-e-f-g}$ (provided that $5 < e < 40$, $0 < f < 25$, $0 < g < 85$ and $25 < e+f+g < 95$ (atom %)).

[8] The information recording medium according to Claim 1 or 2, wherein the dielectric layer comprises $M1_2O_3$.

[9] The information recording medium according to Claim 3, wherein the dielectric layer is represented by $M1_2O_3$–$M2O_2$.

[10] The information recording medium according to Claim 8 or 9, wherein the dielectric layer further comprises D (provided that D is at least one compound selected from Al_2O_3, Ga_2O_3, MgO, ZnO, Ta_2O_5, TiO_2, CeO_2, In_2O_3, SnO_2, TeO_2, Nb_2O_5, Cr_2O_3, Bi_2O_3, AlN, Cr–N, Ge–N, Si_3N_4 and SiC).

[11] The information recording medium according to Claim 9, wherein the dielectric layer is represented by the composition formula $(M1_2O_3)_x(M2O_2)_{100-x}$ (provided that $20 \leq x \leq 95$ (mol%)).

[12] The information recording medium according to Claim 10, wherein the dielectric layer is represented by the composition formula $(M1_2O_3)_y(D)_{100-y}$ (provided that $20 \leq y \leq 95$ (mol%)).

[13] The information recording medium according to Claim 10, wherein the dielectric layer is represented by the compositional formula $(M1_2O_3)_z(M2O_2)_w(D)_{100-z-w}$ (provided that $20 \leq z \leq 90$, $5 \leq w \leq 75$ and $25 \leq z+w \leq 95$ (mol%)).

[14] The information recording medium according to any one of Claims 1 through 13, wherein the recording layer goes through a phase-change between a crystalline phase and an amorphous phase.

[15] The information recording medium according to Claim 14, wherein the recording layer comprises Ge, Te, and at least one element selected from Sb, Bi, In and Sn.

[16] The information recording medium according to Claim 15, wherein the recording layer is represented by any of (Ge–Sn)Te, GeTe–Sb_2Te_3, (Ge–Sn)Te–Sb_2Te_3, GeTe–Bi_2Te_3, (Ge–Sn)Te–Bi_2Te_3, GeTe–$(Sb–Bi)_2Te_3$, (Ge–Sn)Te–$(Sb–Bi)_2Te_3$, GeTe–$(Bi–In)_2Te_3$ and (Ge–Sn)Te–$(Bi–In)_2Te_3$.

[17] The information recording medium according to any one of Claims 1 through 16, further comprising an interface layer between the dielectric layer and the recording layer.

[18] The information recording medium according to Claim 17, wherein the interface layer comprises O, at least one element selected from Zr, Hf, Y and Si, and at least one element selected from Ga, In and Cr.

[19] The information recording medium according to Claim 17, wherein the interface layer comprises at least one oxide selected from ZrO_2, HfO_2, Y_2O_3 and SiO_2, and at least one oxide selected from Ga_2O_3, In_2O_3 and Cr_2O_3.

[20] The information recording medium according to any one of Claims 1 through 19, wherein M1 is Dy.

[21] The information recording medium according to any one of Claims 1 through 19, wherein M1 is a mixture of Dy and Y.

[22] A method for manufacturing an information recording medium, comprising at least forming a recording layer and forming a dielectric layer,

wherein a sputtering target comprising at least O and M1 (provided that M1 is at least one element selected from Sc, Y, La, Gd, Dy and Yb) is used in forming the dielectric layer.

[23] A method for manufacturing an information recording medium comprising forming at least two information layers,

wherein forming at least one information layer includes forming a recording layer and forming a dielectric layer, and a sputtering target comprising at least O and M1 (provided that M1

is at least one element selected from Sc, Y, La, Gd, Dy and Yb) is used in forming the dielectric layer.

[24] The method for manufacturing an information recording medium according to Claim 22 or 23, wherein the sputtering target used in forming the dielectric layer further comprises M2 (provided that M2 is at least one element selected from Zr, Hf, and Si).

[25] The method for manufacturing an information recording medium according to any one of Claims 22 through 24, wherein the sputtering target used in forming dielectric layer further comprises M3 (provided that M3 is at least one element selected from Al, Ga, Mg, Zn, Ta, Ti, Ce, In, Sn, Te, Nb, Cr, Bi, Al, Cr, Ge, N and C).

[26] The method for manufacturing an information recording medium according to Claim 24, wherein the sputtering target used in forming the dielectric layer is represented by the composition formula $M1_hM2_iO_{100-h-i}$ (provided that $5 < h < 45$ and $0 < i < 30$ (atom %)).

[27] The method for manufacturing an information recording medium according to Claim 25, wherein the sputtering target used in forming the dielectric layer is represented by the composition formula $M1_jM3_kO_{100-j-k}$ (provided that $0 < j < 50$, $0 < k < 90$ and $20 < j+k < 100$ (atom %)).

[28] The method for manufacturing an information recording medium according to Claim 25, wherein the sputtering target used in forming the dielectric layer is represented by the composition formula $M1_lM2_mM3_nO_{100-l-m-n}$ (provided that $0 < l < 45$, $0 < m < 30$, $0 < n < 90$ and $20 < l+m+n < 100$ (atom %)).

[29] The method for manufacturing an information recording medium according to Claim 22 or 23, wherein the sputtering target used in forming the dielectric layer comprises $M1_2O_3$.

[30] The method for manufacturing an information recording medium according to Claim 24, wherein the composition of the sputtering target used in forming the dielectric layer is represented by $M1_2O_3$–$M2O_2$.

[31] The method for manufacturing an information recording medium according to Claim 29 or 30, wherein the sputtering target used in forming the dielectric layer further comprises D (provided that D is at least one compound selected from Al_2O_3, Ga_2O_3, MgO, ZnO, Ta_2O_5, TiO_2, CeO_2, In_2O_3, SnO_2, TeO_2, Nb_2O_5, Cr_2O_3, Bi_2O_3, AlN, Cr–N, Ge–N, Si_3N_4 and SiC).

[32] The method for manufacturing an information recording medium according to Claim 30, wherein the sputtering target used in forming the dielectric layer is represented by the composition formula $(M1_2O_3)_s(M2O_2)_{100-s}$ (provided that $15 \leq s < 100$ (mol%)).

[33] The method for manufacturing an information recording medium according to Claim 31, wherein the sputtering target used in forming the dielectric layer is represented by the composition formula $(M1_2O_3)_t(D)_{100-t}$ (provided that $15 \leq t < 100$ (mol%)).

[34] The method for manufacturing an information recording medium according to Claim 31, wherein the sputtering target used in forming the dielectric layer is represented by the composition formula $(M1_2O_3)_u(M2O_2)_v(D)_{100-u-v}$ (provided that $15 \leq u \leq 95$, $0 < v \leq 80$ and $15 < u+v < 100$ (mol%)).

[35] The method for manufacturing an information recording medium according to any one of Claims 22 through 34, wherein the method is further comprises forming an interface layer between forming the recording layer and forming the dielectric layer.

[36] The method for manufacturing an information recording medium according to any one of Claims 22 through 35, wherein either Ar gas is used or a gas mixture of Ar gas and O_2 gas is used when forming the dielectric layer.